UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 96026

MSAS 119

OVER

POND OUTLET

DISTRICT 1 – ST. LOUIS COUNTY, CITY OF DULUTH

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure inspected at structure No. 96026, a concrete box culvert, was found to be in good condition with no defects of structural significance.

INSPECTION FINDINGS:

(A) Joints between culvert sections exhibited from ¼ to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a ½ inch differential across various joints.

(B) The channel bottom consisted of sandy infilling at west opening. From entrance to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor, and after that, the channel bottom consisted of sand and gravel on the culvert floor.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 96026

Feature Crossed: Pond Outlet

Feature Carried: MSAS 119

Location: District 1 – St. Louis County, City of Duluth

Bridge Description: The structure consists of a precast concrete box culvert (10 foot wide opening).

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 15, 2007

Weather Conditions: Partly Cloudy, 48^{o} F

Underwater Visibility: None / Negligible

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Culvert.

General Shape: Precast Box Culvert.

Maximum Water Depth at Substructure Inspected: Approximately 6.0 feet.

4. WATERLINE DATUM

Water Level Reference: Underside of culvert top slab at west opening.

Water Surface: The waterline was approximately 6.0 inches below the reference.
Assumed Waterline Elevation 99.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code E/07

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

Photograph 1. View of West Opening, Looking Southwest.

Photograph 2. View of East Opening, Looking West.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 15, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 96026 WEATHER: Partly Cloudy, 48° F

WATERWAY CROSSED: Storm Sewer

DIVING OPERATION: _____ SCUBA ___X___ SURFACE SUPPLIED AIR

_____ OTHER_____

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 4:30 p.m.

TIME OUT OF WATER: 5:00 p.m.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY None / Negligible

DEPTH 6.0 feet maximum

ELEMENTS INSPECTED: Culvert

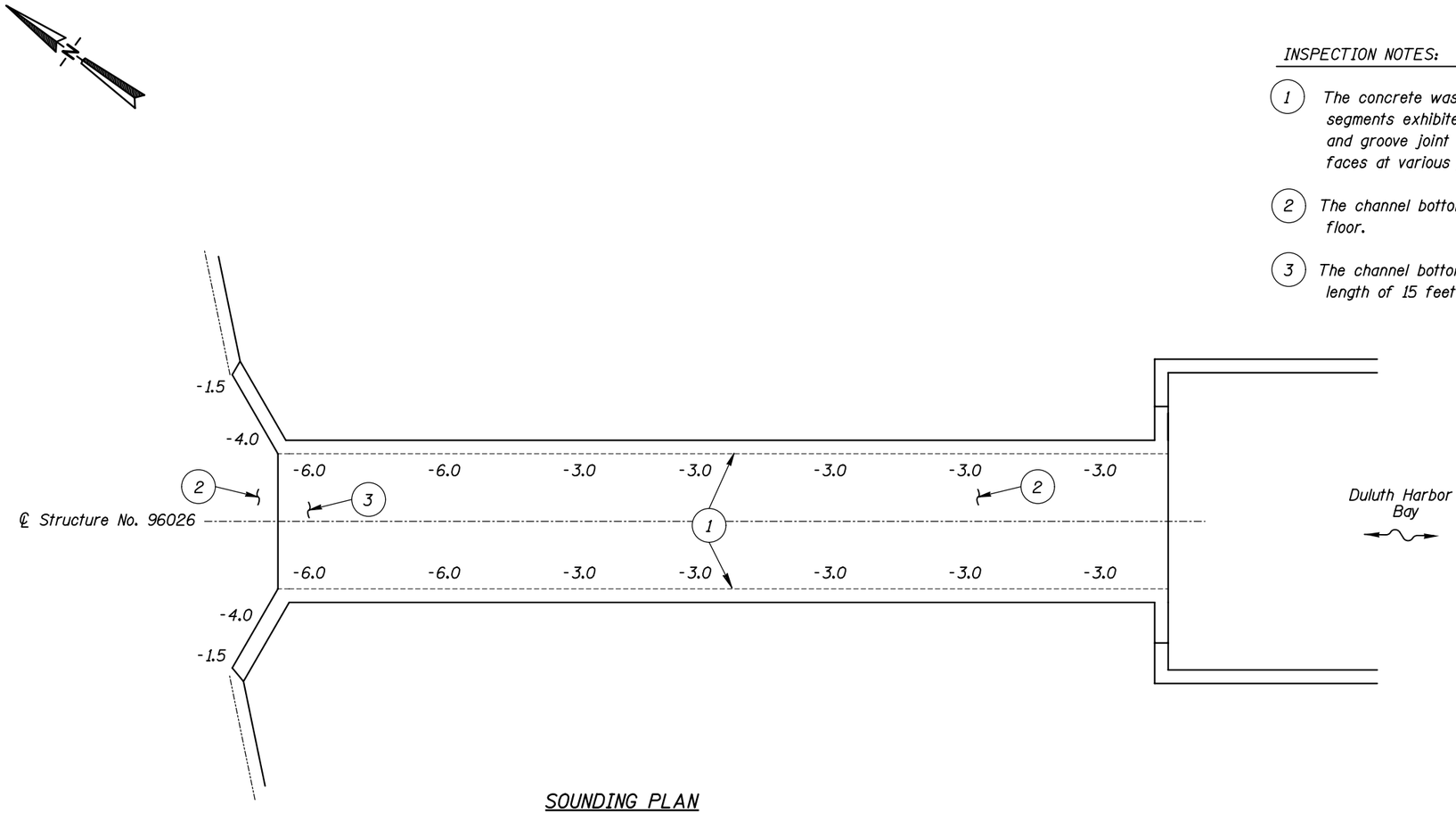
REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. Joints between culvert sections exhibited from ¼ to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a ½ inch differential across various joints. The channel bottom consisted of sandy infilling at west opening. From entrance to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor, and after that, the channel bottom consisted of sand and gravel on the culvert floor.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

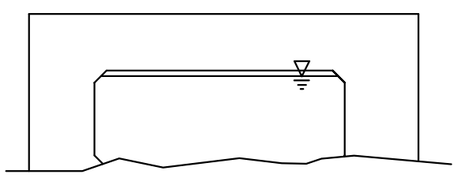
Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

INSPECTION NOTES:

1. The concrete was in smooth and sound condition. The joints between culvert segments exhibited 1/4- to 1-inch-wide horizontal gaps (acceptable for tongue and groove joint arrangement) and up to 1/2-inch differentials across adjacent faces at various joints.
2. The channel bottom consisted of sandy infilling (up to 3 feet deep) on culvert floor.
3. The channel bottom consisted of riprap with no probe rod penetration for a length of 15 feet along the northwestern end of the box culvert.



SOUNDING PLAN



SOUTHEASTERN END VIEW OF CULVERT

GENERAL NOTES:

1. The entire length of the box culvert was inspected underwater.
2. At the time of inspection, on October 15, 2007, the waterline was located approximately 6 inches below the top of the box culvert opening at the westerly headwall. Since insufficient elevation information was available, a waterline reference of 100.0 was assumed. This corresponds to a waterline elevation of 99.5.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken at approximately 10 feet intervals along the length of the box culvert.

Legend

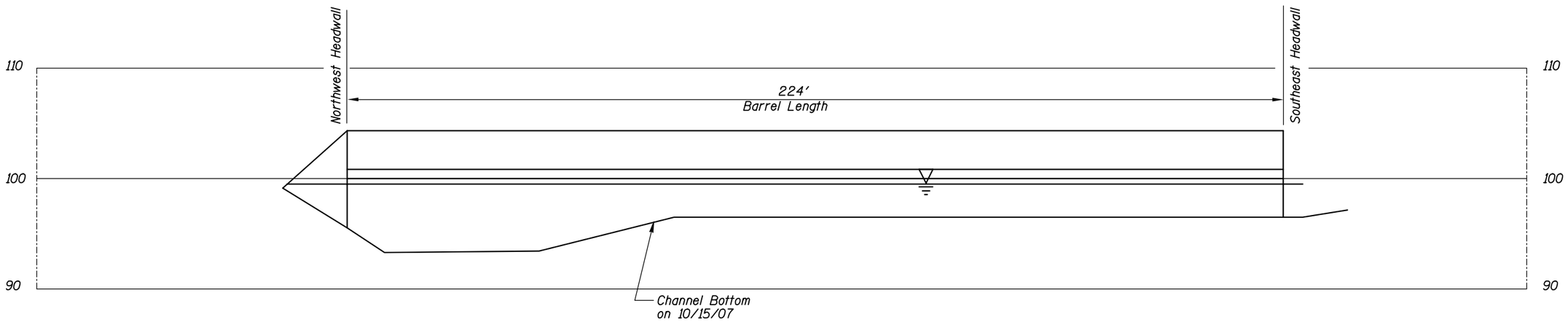
-0.4	Sounding Depth (10/15/07)

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 96026
OVER STREAM
DISTRICT 1, ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MDK	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS
Code: 52216026		Figure No.: 1



℄ CULVERT PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 96026
OVER STREAM
DISTRICT 1, ST. LOUIS COUNTY

CENTERLINE ELEVATION
PROFILE

Drawn By: MDK	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS
Code: 52216026		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 15, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 96026 WEATHER: Partly Cloudy, 48° F

WATERWAY CROSSED: Storm Sewer

DIVING OPERATION: _____ SCUBA ___X___ SURFACE SUPPLIED AIR

_____ OTHER_____

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 4:30 p.m.

TIME OUT OF WATER: 5:00 p.m.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY None / Negligible

DEPTH 6.0 feet maximum

ELEMENTS INSPECTED: Culvert

REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. Joints between culvert sections exhibited from ¼ to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a ½ inch differential across various joints. The channel bottom consisted of sandy infilling at west opening. From entrance to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor, and after that, the channel bottom consisted of sand and gravel on the culvert floor.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 96026
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Pond Outlet

INSPECTION DATE October 15, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Culvert	6.0’	N	7	N	8	N	7	8	N	N	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

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NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.